

# Air Force Civil Engineer Center

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**Miami Valley Regional  
Planning Committee  
Meeting: May 4, 2023**

**Wright-Patterson AFB**  
Greg Plamondon, RPM  
Joseph Ferentz, RPM

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*Your Success is Our Mission!*

Innovate, Accelerate, Thrive – The Air Force at 75



# Agenda



- **Per- and polyfluoroalkyl substances (PFAS)**
- **PFOS & PFOA Facts, Information and Projects**
  - **Phase I Remedial Investigation**
  - **EE/CAs and NTCRAs**
  - **USGS Study**
  - **Quarterly Sentinel Well Sampling**
  - **U.S. EPA Proposed PFAS MCLs**
- **Questions**



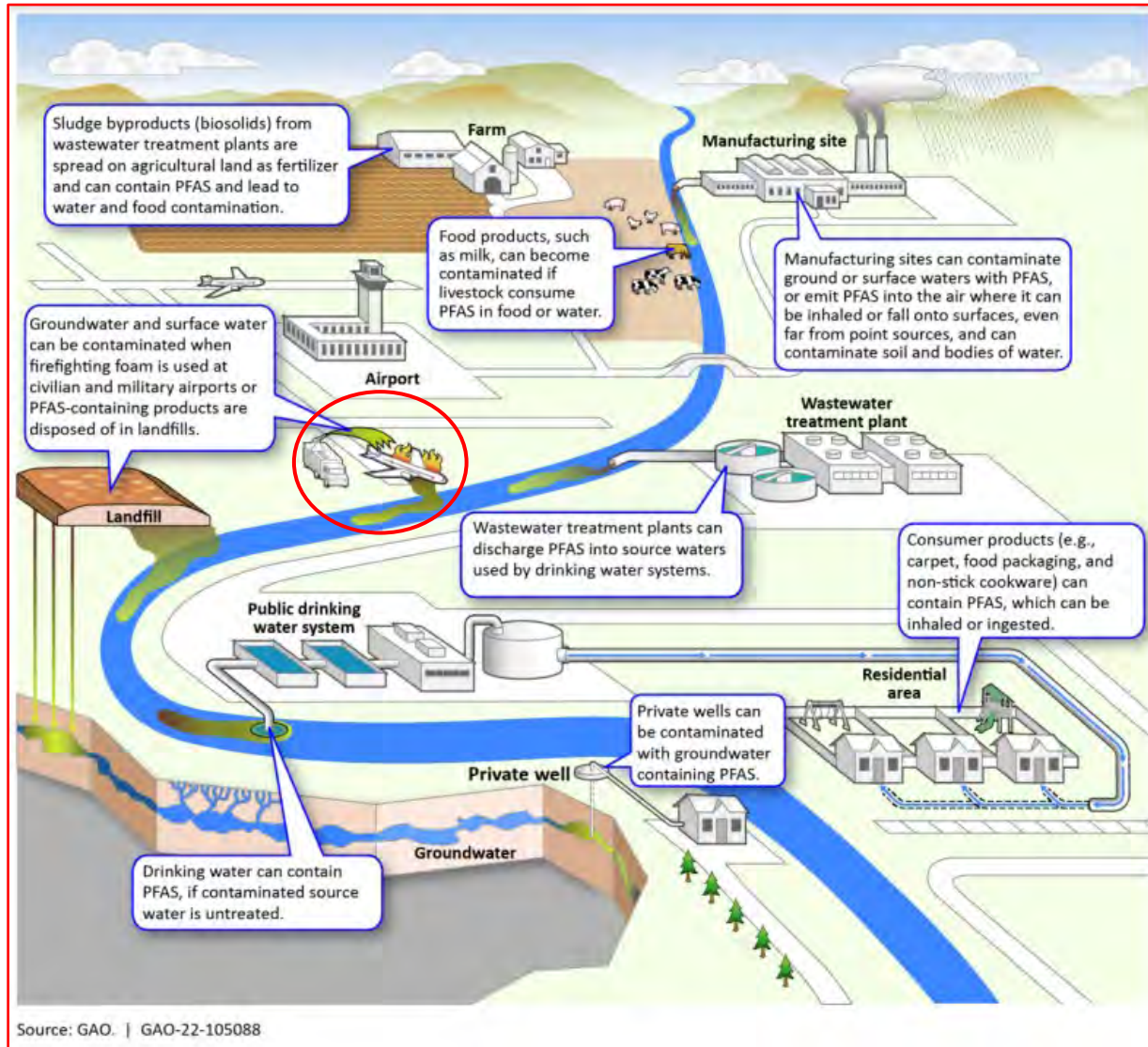


# PFAS Facts and Timeline



- **PFAS are a class of organofluorine chemicals that have been used for decades and can display resistance to oil & water and withstand high temperatures. They are used in a variety of applications, including aqueous film forming foams (AFFF), food packaging and contact materials, textiles, and various industrial uses.**
- **The Air Force is currently doing due diligence to identify PFAS releases from these non-AFFF sources.**
- **For environmental site inspections, DoD currently uses the May 2016 EPA drinking water Lifetime Health Advisory (LHA) level of 70 parts per trillion (ppt) for PFAS compounds perfluorooctane sulfonate (PFOS) and/or perfluorooctanoic acid (PFOA).**

# Possible Routes for PFAS Release into the Environment





# PFAS Facts and Timeline

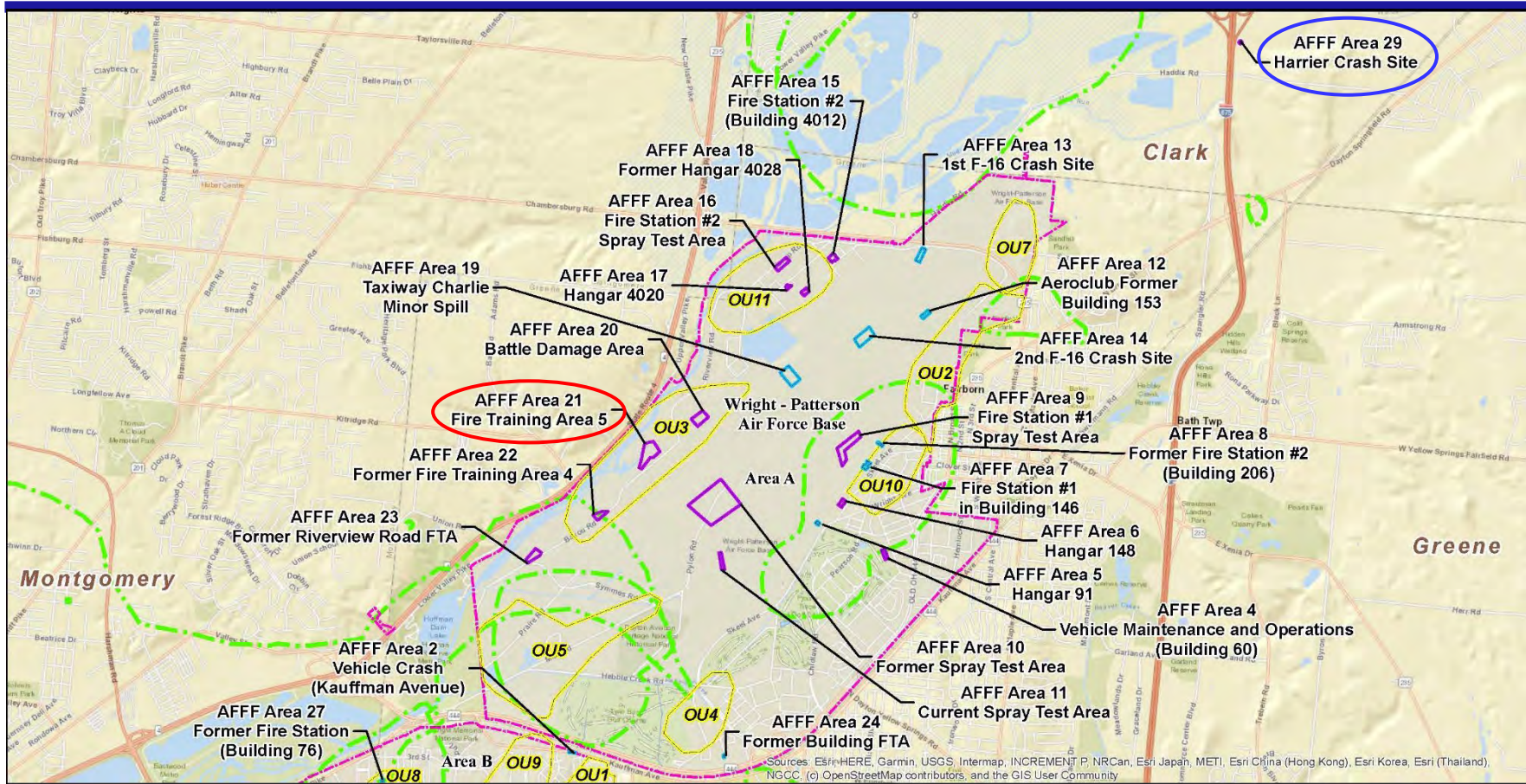


- **To evaluate individual AFFF use areas at WPAFB, a Site Inspection (SI) and an Expanded Site Inspection (ESI) were completed in 2018 and 2020, respectively.**
- **26 AFFF release sites that were verified in the SI and ESI were carried forward for further characterized in a Remedial Investigation (RI).**
- **One site is located outside of the Base boundaries.**
- **Two sites were identified as high priority and are being managed under the U.S. Army Corp of Engineer's Rapid Response Program.**
- **In June 2016, PFAS sampling of select base boundary (sentinel) wells began and continues quarterly**
- **The following figures illustrate the locations of the AFFF release areas at WPAFB.**



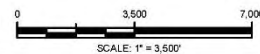
# PFAS Remedial Investigation

## AFFF Site Locations: Area A



- Legend**
- 5-Year Time-of-Travel Boundary
  - Aqueous Film-Forming Foam (AFFF) Areas - Currently part of Phase I Remedial Investigation
  - AFFF Areas - Part of future Phase I Remedial Investigation
  - Operable Unit (OU)
  - Wright - Patterson Air Force Base Installation Area

**Notes:**  
Fire Training Area (FTA)

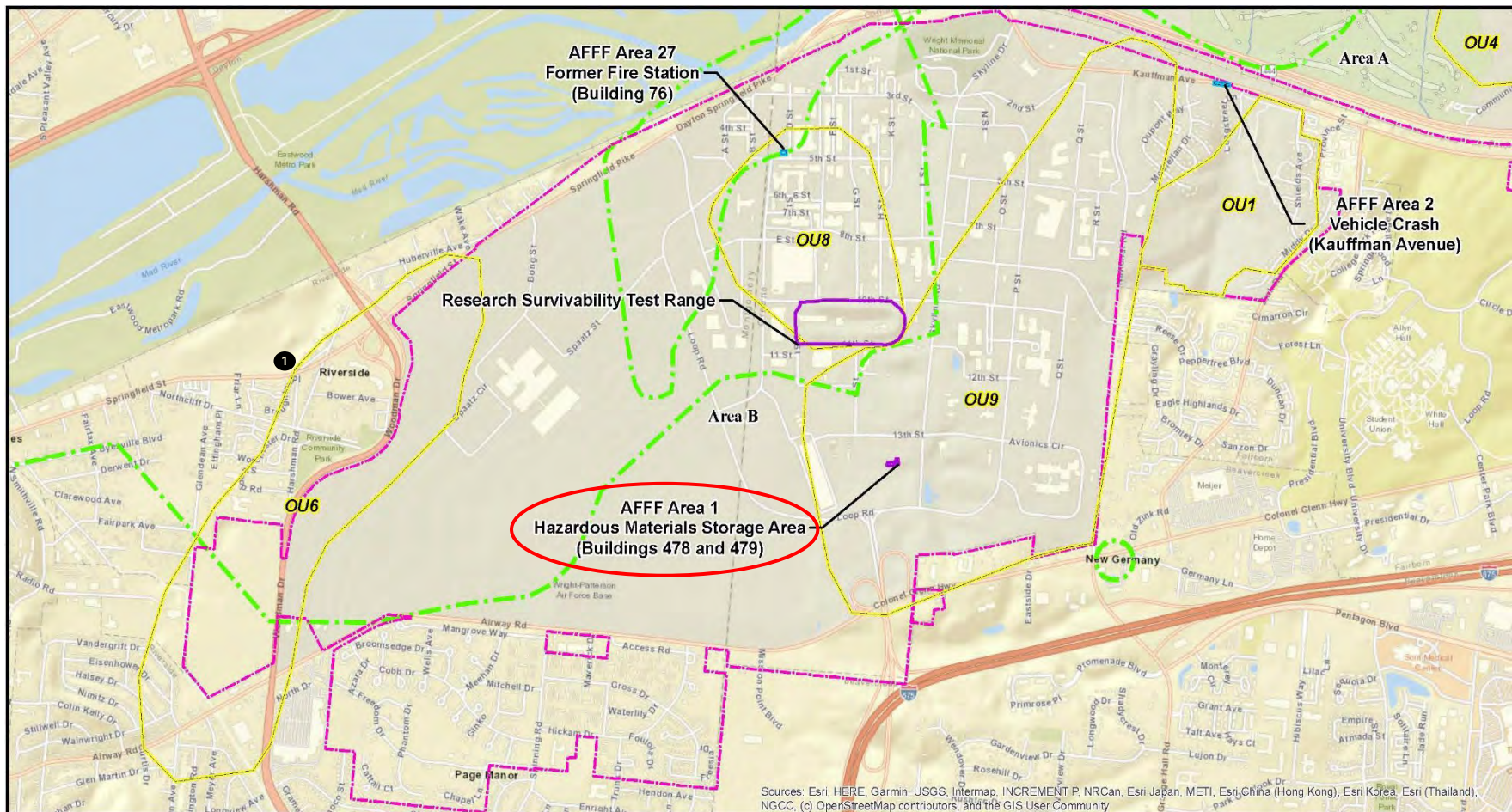


WRIGHT-PATTERSON  
AIR FORCE BASE

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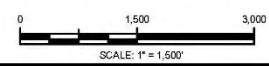
# PFAS Remedial Investigation AFFF Site Locations: Area B



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

- Legend**
- 5-Year Time-of-Travel Boundary
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  - Operable Unit (OU)
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Notes:



OHIO STATE PLANE SOUTH  
(NAD83)



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# RI at AFFF Sites



- **Remedial Investigation Goals**
  - **Determine nature/extent of 6 PFAS compounds,**
  - **Identify potential exposure pathways, and**
  - **Collect sufficient data to support a human health and environmental risk assessment.**
- **Initial phase of field work completed at 14 AFFF sites in September 2022**
  - **Installed 79 monitoring wells, 13 lysimeters, and 26 soil borings**
  - **Collected 110 groundwater samples, 12 lysimeter samples, 220 soil samples, 26 surface/storm water samples and 32 sediment samples**
  - **Data being evaluated to determine additional sampling locations**





Geologist logging soil core and collecting VOC data

Sonic drilling rig to install monitoring wells





# Status of RIs at AFFF Sites



- **As of 27 Feb**
  - **Contractor completed 2nd round of groundwater (79 MWs), surface water and sediment sampling and 3rd quarterly round of lysimeter sampling (13)**
  - **Completed 1st Quarter 2023 Sentinel Well Sampling event (14 MWs)**
  - **Anticipate scoping meeting with regulators to discuss step out sampling based on results from RI sampling in April**
- **Final 2021 Annual Perimeter Well Monitoring Report submitted on 17 March 2023**
- **Draft 2022 Annual Perimeter Well Monitoring Report submitted in April 2023**



# Engineering Evaluation/Cost Analysis (EE/CA) at 5 AFFF Sites



- The project goal is to select site remedies for the 5 AFFF sites through the EE/CA process and submit Action Memorandums (AMs) to memorialize the selections.
- The 5 sites include:
  - AFFF Area 4 (Maintenance Building 60) and AFFF Area 17 (Hangar 4020)
    - Final under regulatory review
  - AFFF Area 11 (Current Spray Test Area)
    - Regulatory concurrence received
  - AFFF Area 22 (Fire Training Area 4) and AFFF Area 23 (Former Riverview Road FTA)
    - Submittal of Final EE/CA is pending
- EE/CAs are submitted for a 30-day public comment period to finalize the document, followed by an AM.
- Anticipate implementation of the selected alternatives in FY24



# Non-Time Critical Removal Actions (NTCRAs)



- **NTCRAs are being conducted concurrently at AFFF Areas 1 (Area B) and 21 (Area A) to mitigate downgradient PFAS-impacted groundwater and surface water. The NTCRA objectives for each site include:**
  - **Evaluate results of the Data Gap Investigation (DGI) to support the EE/CAs for each site,**
  - **Conduct a Pilot Treatment Study at AFFF Area 21 to evaluate the performance of various treatment media for PFAS in groundwater. Completed August 2022,**
  - **The public review period for the Area 1 EE/CA completed December 2022. The Final Area 21 EE/CA has been submitted for public review and comments until May 21, 2023.**
  - **Action Memorandums memorializing the selected remedies for each site follow the approved EE/CAs,**
  - **Construct the selected mitigation system based on the approved EE/CA and Action Memorandum for each site.**

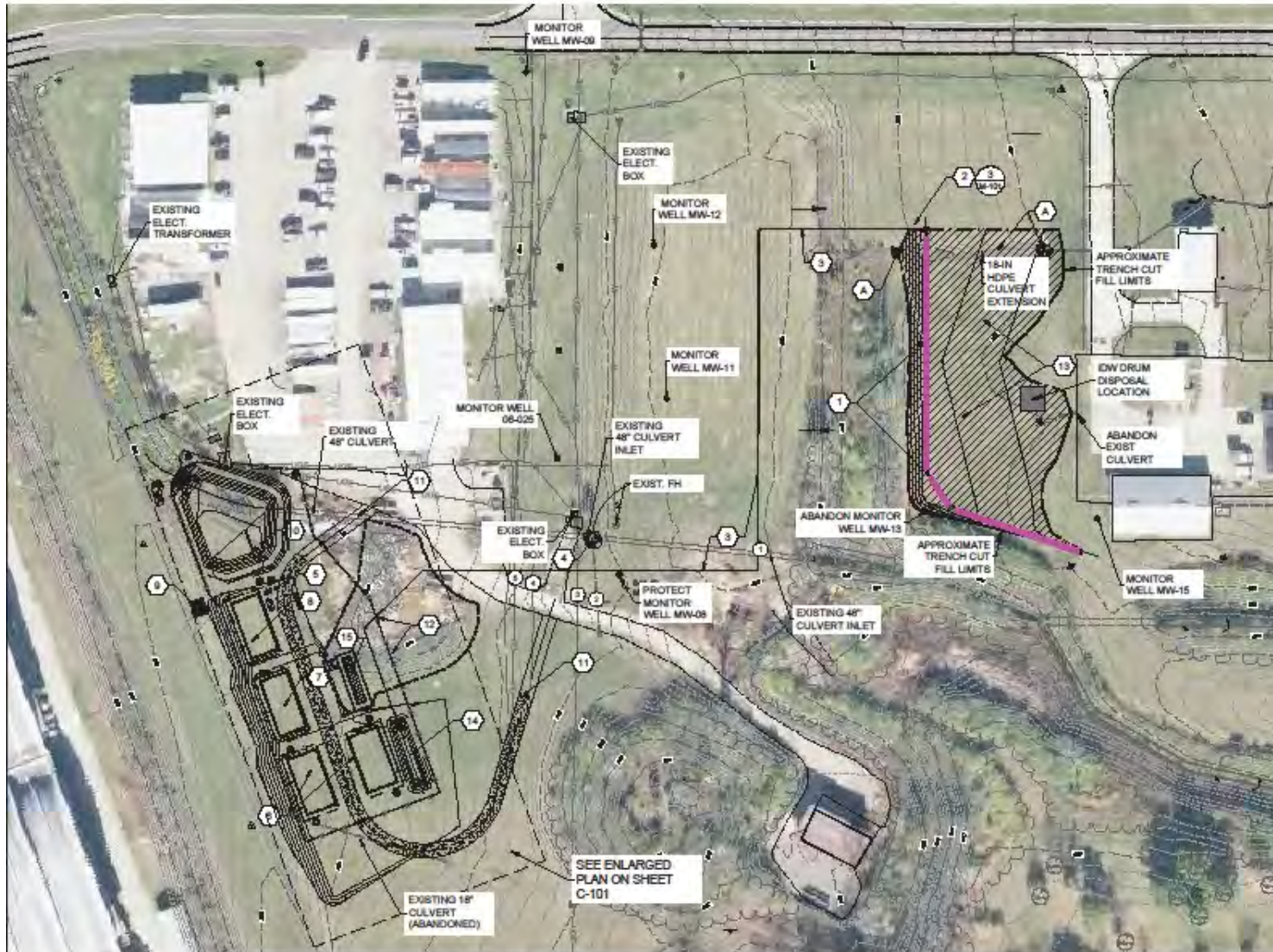


# Non-Time Critical Removal Action Project Locations





# AFFF Area 1: Groundwater Treatment Facility Site Plan





# AFFF Area 1: One-Pass Trenching



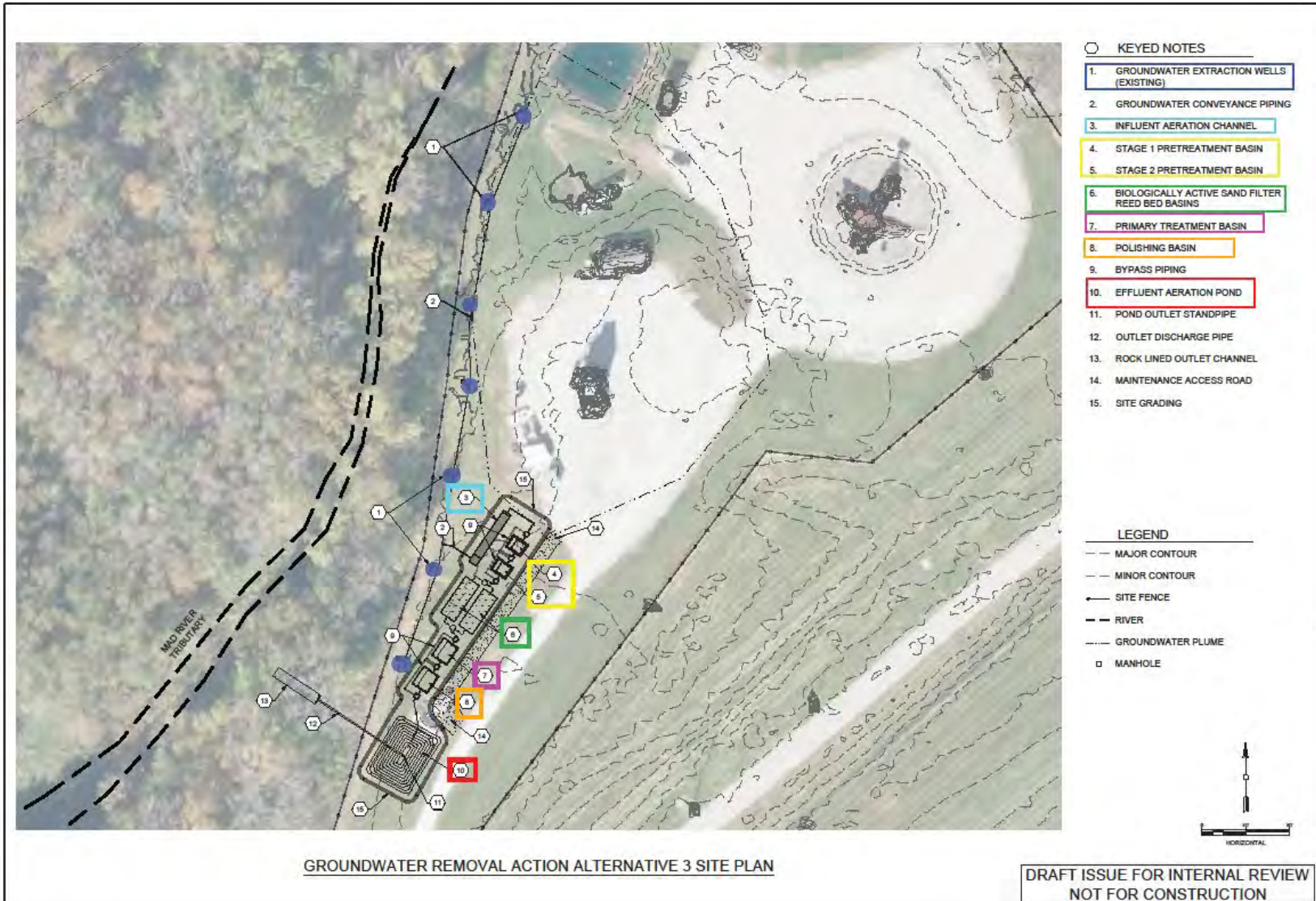


# AFFF Area 1: Trenching Operation





# AFFF Area 21: Groundwater Extraction and Passive Bed Treatment





# US Geological Survey Surface Water Sampling



- **The primary goals of this project are:**
  - **To collect surface water samples and discharge measurements to verify the efficacy of NTCRAs at AFFF Area 1 in Area B leading to Outfall 1 and AFFF Area 21 in Area A adjacent to Mad River by evaluating the mass flux of PFAS in surface water.**
  - **In FY 22 the project collected: 298 discrete samples and 142 Polar Organic Chemical Integrative Sampler (POCIS) samples. These data are currently under review.**
  - **169 discharge measurements and 15 river stage measurements were made and used to estimate PFAS mass flux.**
- **Fiscal Year 23 funds for this project have been obligated. Sampling will continue to confirm the effects of the treatment system installations.**



# USGS Stream Sampling





# Quarterly Sentinel Well Sampling



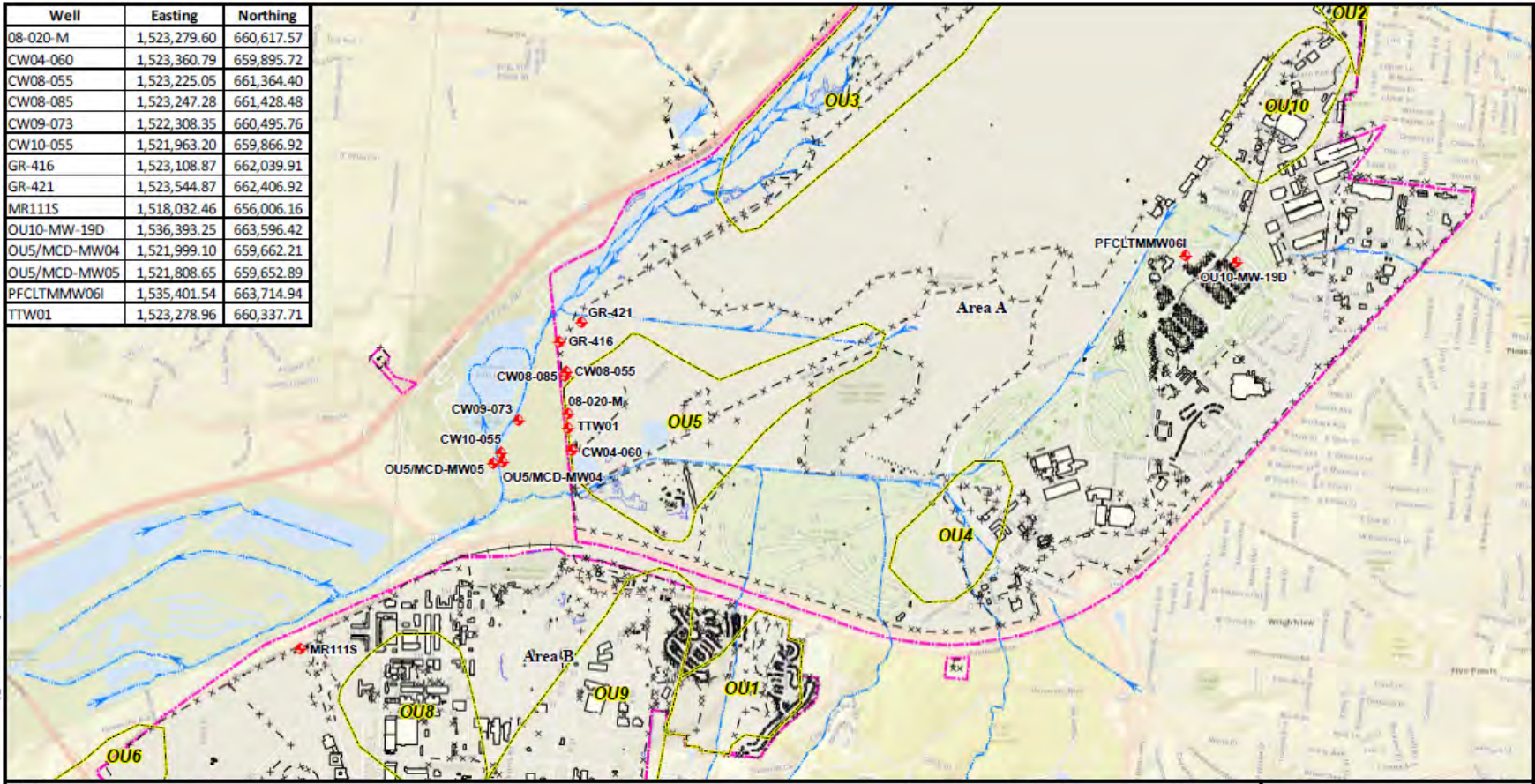
- **To monitor for potential downgradient impacts from these PFAS sites, WPAFB continues to conduct quarterly sampling at 14 sentinel monitoring wells.**
- **Last sampling event occurred in February 2023.**
- **General Findings (December data) Update**
  - **3 Wells above 2016 LHAs**
  - **Compared to current Regional Screening Levels (RSLs), 14 wells were above PFOA RSL (6 ppt), 4 wells were above PFOS RSL (4 ppt) and 8 wells were above PFHxS RSL (39 ppt)**
  - **GenEx, PFBS, and PFNA did not exceed their respective RSLs**



# Quarterly PFAS Sentinel Monitoring Well Network



Well	Easting	Northing
08-020-M	1,523,279.60	660,617.57
CW04-060	1,523,360.79	659,895.72
CW08-055	1,523,225.05	661,364.40
CW08-085	1,523,247.28	661,428.48
CW09-073	1,522,308.35	660,495.76
CW10-055	1,521,963.20	659,866.92
GR-416	1,523,108.87	662,039.91
GR-421	1,523,544.87	662,406.92
MR111S	1,518,032.46	656,006.16
OU10-MW-19D	1,536,393.25	663,596.42
OU5/MCD-MW04	1,521,999.10	659,662.21
OU5/MCD-MW05	1,521,808.65	659,652.89
PFCLTMMW06I	1,535,401.54	663,714.94
TTW01	1,523,278.96	660,337.71





# PFAS Technical Meetings



- **PFAS Technical Meetings between WPAFB, US EPA, Ohio EPA and the City of Dayton are held monthly.**

## **Objectives:**

- Maintaining lines of communication and points of contact
- Share data collected by WPAFB and City of Dayton
- Discussed Dayton concerns regarding Air Force projects
- Shared expectations for future meetings
- Discuss potential/future projects



# U.S. EPA Proposed PFAS MCLs



- **EPA is proposing a National Primary Drinking Water Regulation to establish legally enforceable Maximum Contaminant Levels (MCLs), for six PFAS compounds:**
  - **PFOA and PFOS will be regulated as individual contaminants with a proposed MCL of 4 ppt for each, and**
  - **PFHxS, PFNA, PFBS, Nd HFPO-DA (commonly referred to as GenX Chemicals) as a mixture.**
  - **The PFAS mixture compounds have an MCL in the form of a Hazard Index with 1.0 being the MCL**
  - **The Hazard Index is a tool (formula) use to evaluate potential health risks from exposure to chemical mixtures.**



# PFOS and PFOA Facts and Information



- For more information of PFAS, go to:

## USEPA

- <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

## Centers for Disease Control

- [https://www.cdc.gov/biomonitoring/PFAS\\_FactSheet.html](https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html)

## Air Force Civil Engineer Center

- <https://www.afcec.af.mil/What-We-Do/Environment/Per-and-Polyfluoroalk-Substances/Frequently-Asked-Questions/>

## National Institute of Environmental Health Sciences

- <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>

## Ohio EPA

- <https://epa.ohio.gov/monitor-pollution/pollution-issues/per-and-polyfluoroalkyl-substances-pfas>







# DAYTON

## PFAS INFORMATION

Presented to the MVRPC Board

May 4, 2023

Michael Powell, Director

Department of Water

## Health Advisory Levels (HALs): 2013-2016

- PFOA: 200 ppt \*
- PFOS: 400 ppt

## Health Advisory Levels (HALs): May 2016

- PFOA: 70 ppt
- PFOS: 70 ppt
- Combined: 70 ppt

## HALs: June 15, 2022

- PFOA: 4 ppq\*\* (0.004 ppt) *interim*
- PFOS: 20 ppq (0.020 ppt) *interim*

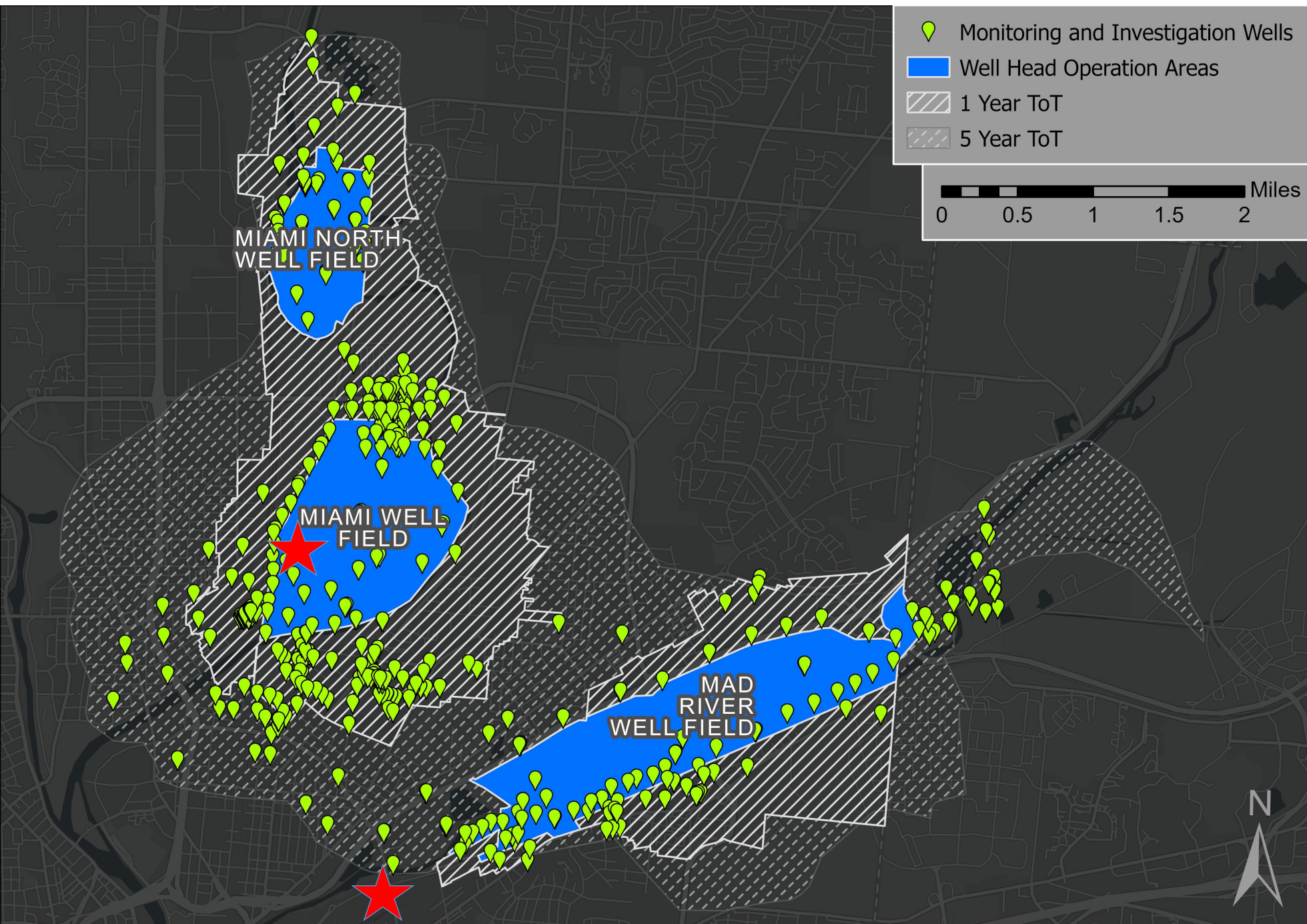
## Proposed Maximum Contaminant Level (MCL): March 14, 2023

- PFOA: 4.0 ppt
- PFOS: 4.0 ppt

\*ppt=parts per trillion  
\*\*ppq=parts per quadrillion  
Note: 1 ppt=1,000 ppq

## City of Dayton Well Fields

- Two Well Fields: Miami and Mad River
- Over 500 Monitoring Wells
- ★ Water Treatment Plants



## Water Treatment Plants (2017-Present)

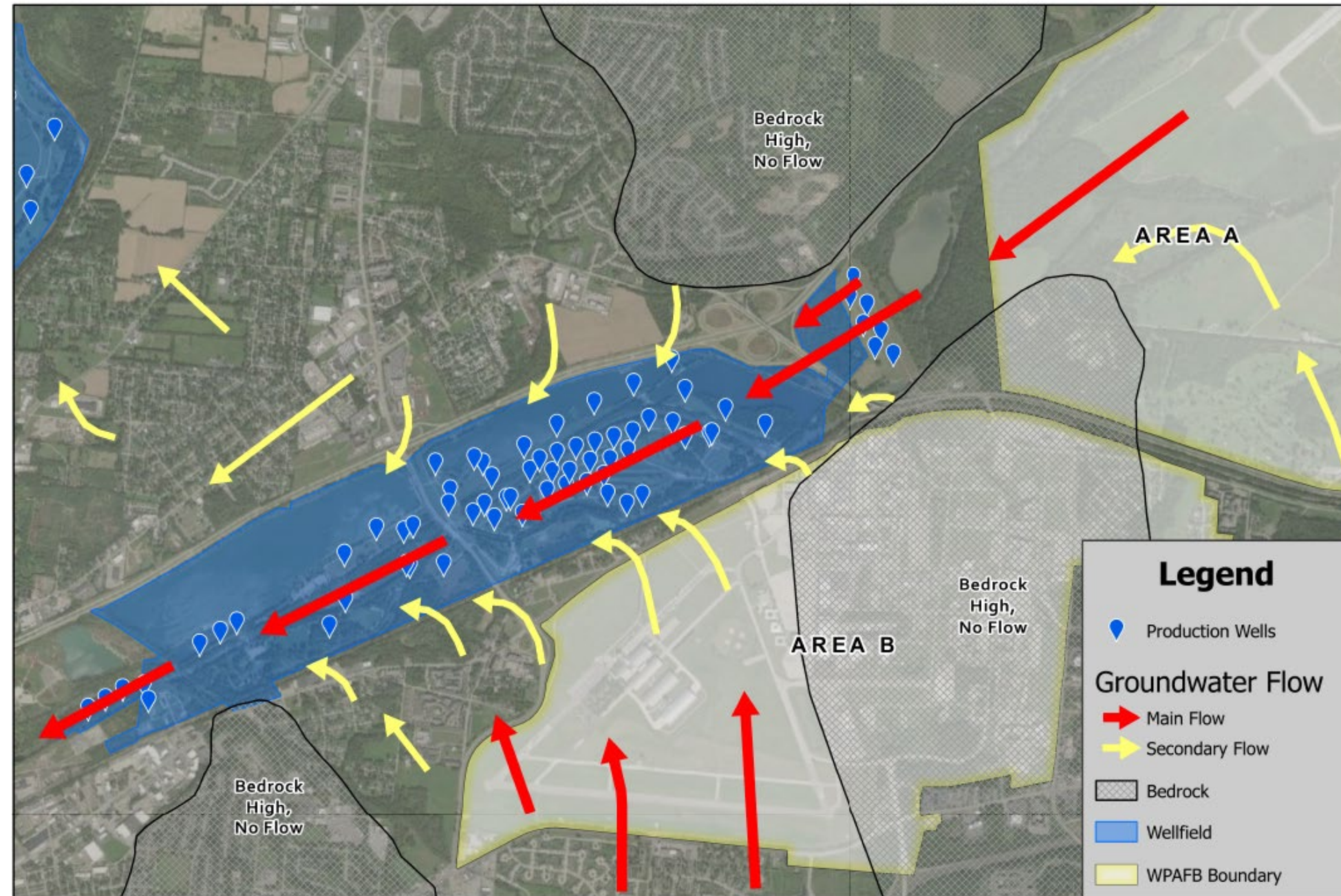
### Ottawa Water Treatment Plant

- PFOA: Non-Detect (ND) - 5.14 ppt
- PFOS: ND - 13.7 ppt

### Miami Water Treatment Plant

- PFOA: ND
- PFOS: ND

*(Proposed MCL is 4.0 ppt for PFOA and 4.0 ppt for PFOS)*



General groundwater flow from both areas of WPAFB is toward the Mad River Wellfield

2017-  
2018

- Installed over 100 additional monitoring well locations to evaluate PFAS contamination. Collected groundwater samples from over 1,000 locations to support the investigation.

2018-  
2019

- Implemented a feasibility study to understand potential treatment options to address PFAS.

2019-  
ongoing

- Engaged the Air Force, US EPA and Ohio EPA in Technical Meetings on mitigating the PFAS plume from WPAFB.

2019

- Filed a lawsuit against the chemical manufacturers of PFAS.

2020

- Filed a lawsuit against the Air Force because the clean-up of the PFAS was not progressing at a pace to meet the upcoming treatment standards (MCLs).

2021-  
Present

- Continuous monitoring of PFAS plumes originating from WPAFB and requesting additional remedial projects to cut off the PFAS plumes that threaten the wellfield.
- Implementing strategy to convey water from Miami Well Field to Ottawa Water Treatment Plant.

## **Strategy:**

- Increase capacity at Miami Well Field
- Convey water from Miami Well Field to Ottawa Water Treatment Plant
- Install PFAS treatment at Ottawa Water Treatment Plant

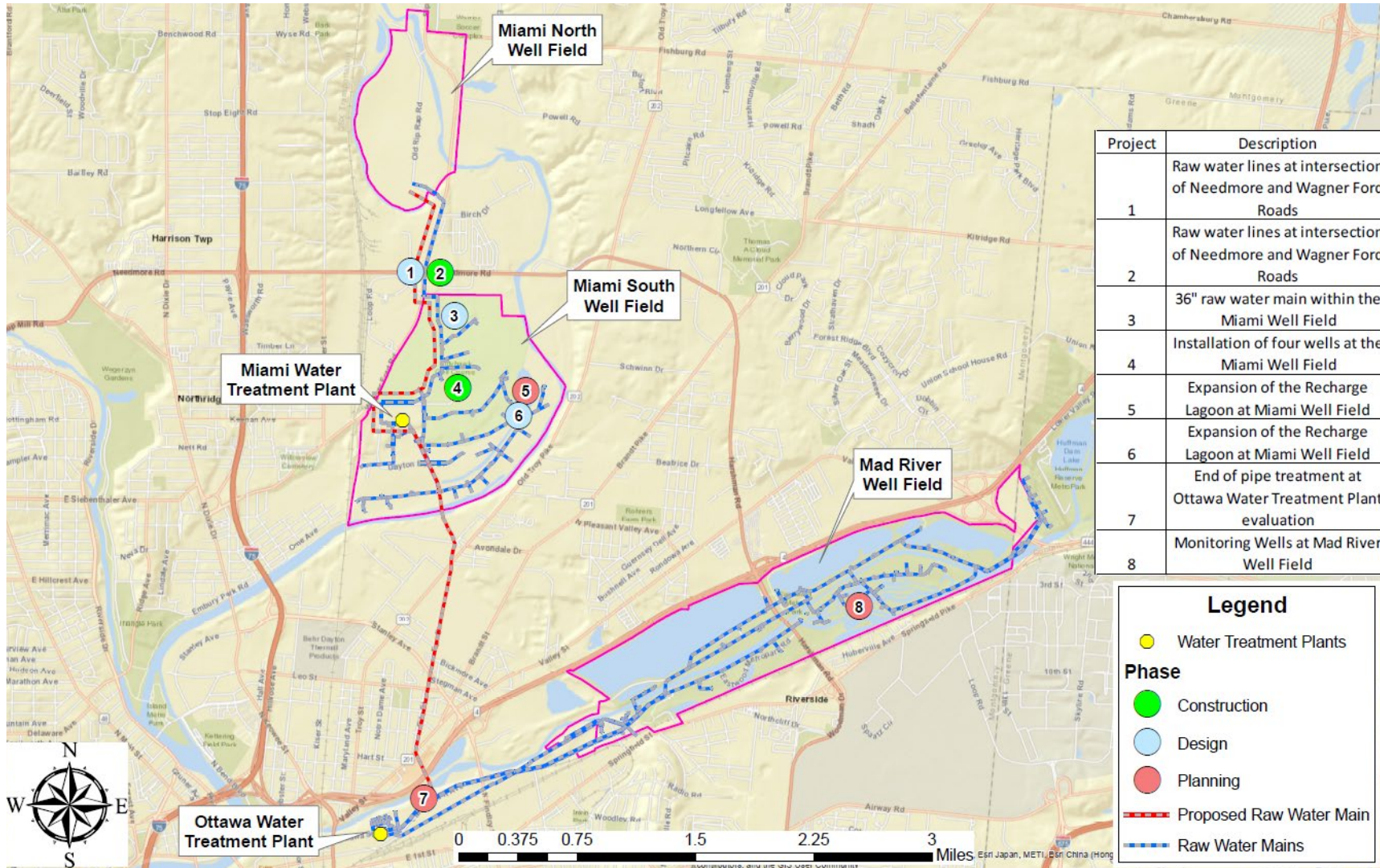
## **Estimated Costs: \$350M**

**Funding Sources:** Working with the regulatory agencies and elected officials to seek funding for PFAS related projects

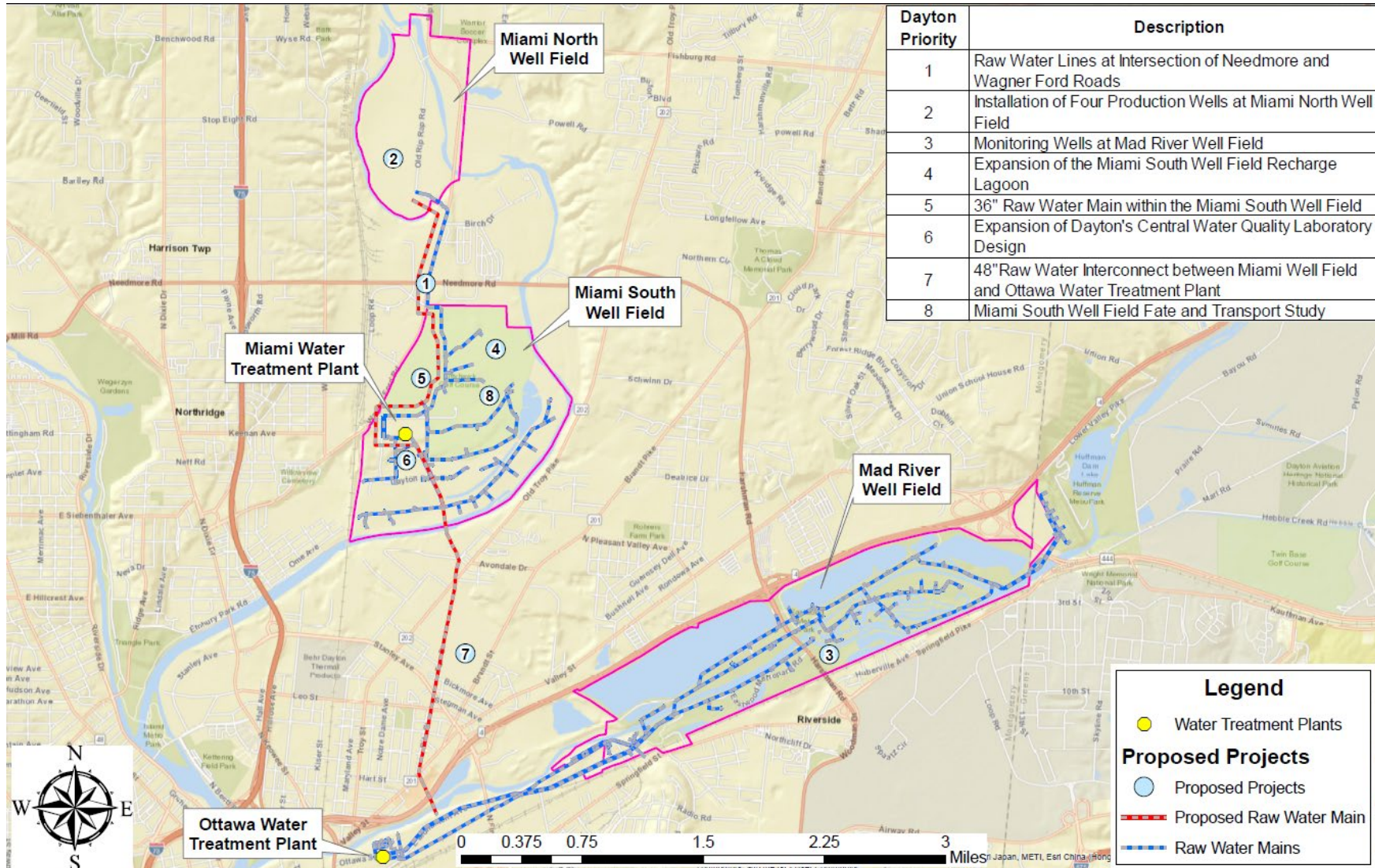
- OEPA 0% interest and principal forgiveness funding is available for the next five (5) years
- Nominated projects totaling \$42.9M
  - 2022: \$14.9M
  - 2023: \$28.0M



## Dayton Emerging Contaminant PY22 Project Locations



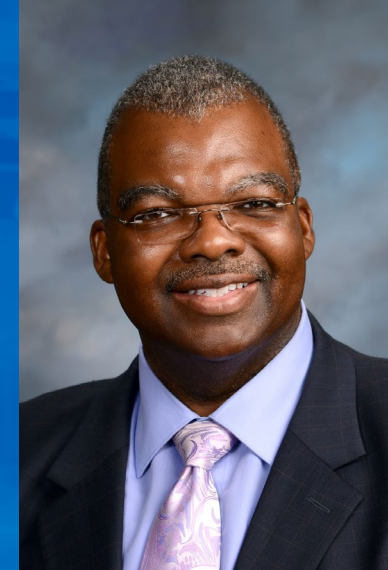
## Dayton Emerging Contaminant PY23 Project Locations



- Dayton has and will continue to stay abreast of PFAS regulations
- Continued collaboration between Dayton and its regional partners is essential to manage the PFAS contamination that continues to impact the water supply for 400,000 residents
- The solution to the problem is expensive (\$350M), and the City's ratepayers should not have to bear the burden of the solution
- Federal funding needs to be made available to address the issue



# QUESTIONS?



Michael Powell, Director  
Department of Water